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August 21, 2003

Mr. Gary B. Folley
Alaska Department of Environmental Conservation
Division of Spill Prevention and Response
4335 K-Beach Road, Suite 11
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Soldotna, Alaska 99669

**Subject: Kasitsna Bay Research Laboratory, Seldovia, Alaska
ADEC Spill No. 00239934301
Draft Site Characterization Plan**

Dear Mr. Folley:

On behalf of the National Oceanic and Atmospheric Administration (NOAA), and reflecting telephone conversations held between Tetra Tech EM Inc. (Tetra Tech), the Alaska Department of Environmental Conservation (ADEC), the Alaska Department of Fish and Game (ADF&G), and the Alaska Department of Natural Resources, Tetra Tech is providing your office with a revised site characterization plan for the subject site. The draft plan was submitted on May 29, 2003, and you provided your approval of that plan on June 17, 2003. However, after initiating the permitting process, Tetra Tech learned that various state agencies are averse to conducting test pit operations in the intertidal area because the Kasitsna Bay site is located in the Kachemak Bay State Critical Habitat Area.

Specifically, Tetra Tech was notified that ADF&G will not issue a Special Area Permit until September 2003 for work in the intertidal area bordering the NOAA facility. ADF&G has also requested that intertidal excavation be delayed until completion of the proposed upland investigation and that the need for the intertidal excavation be re-evaluated based on the extent of contamination discovered during the upland investigation. In addition, based on the regulations at Title 18 of the Alaska Administrative Code, Part 75, it is unlikely that further investigation in the intertidal area would lead to a cleanup action, as petroleum contaminants detected at the site are located beneath the biotic zone. Based on previous investigation, the petroleum contamination was observed 8 feet below ground surface in the intertidal zone.

Therefore, as you suggested, Tetra Tech has revised the site characterization plan to remove Objective 6 – Evaluate Extent of Petroleum Contaminated Soil in Intertidal Area. Tetra Tech will conduct a thorough walk-through of the area beneath the gabion wall to identify any evidence of surface release. If none is found, no samples will be collected, and the only work conducted will be that discussed in the site characterization plan for the upland area of the site.

The draft final site characterization plan is included as Enclosure A, in redline-strikeout format for your ease in review. E-mail correspondence with ADF&G is provided as Enclosure B.


Mr. Gary B. Folley

August 20, 2003

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Please provide review comments at your nearest convenience to Mr. Minh Trinh of NOAA, with copy to me. If you have any questions regarding this submittal, please contact me directly at (425) 673-3680.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ken Valder', is written over a light gray rectangular background.

Ken Valder
Program Manager

Enclosures: Draft Final Site Characterization Plan
 E-mail Correspondence with ADF&G regarding intertidal excavations

ENCLOSURE 1

**DRAFT FINAL SITE CHARACTERIZATION PLAN
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

AUGUST 21, 2003

Draft Final

**Site Characterization Plan
Kasitsna Bay Field Laboratory
Seldovia, Alaska**

May 29, 2003 August 21, 2003

Prepared For:



National Oceanic and Atmospheric Administration
Central Administrative Support Center
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Prepared By:



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ABBREVIATIONS AND ACRONYMS

µg/L	Microgram per liter
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ASTM	American Society for Testing and Materials
AST	Aboveground storage tank
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
CSM	Conceptual site model
DRO	Diesel-range organic compounds
EPA	U.S. Environmental Protection Agency
GRO	Gasoline-range organic compounds
mg/kg	Milligram per kilogram
MS/MSD	Matrix spike and matrix spike duplicate
NOAA	National Oceanic and Atmospheric Administration
PAH	Polynuclear aromatic hydrocarbons
PCS	Petroleum-contaminated soil
PID	Photoionization detector
QA/QC	Quality assurance and quality control
Rozak	Rozak Engineering
RRO	Residual-range organic compounds
SCP	Site characterization plan
SCR	Site characterization report
TAH	Total aromatic hydrocarbons
TAqH	Total aqueous hydrocarbons
Tetra Tech	Tetra Tech EM Inc.
TPH	Total petroleum hydrocarbons
yd ³	Cubic yard

1.0 INTRODUCTION

Under Contract No. 50WCNA906018, Tetra Tech EM Inc. (Tetra Tech) received a statement of work dated February 25, 2003, from the National Oceanic and Atmospheric Administration (NOAA) to conduct site characterization work at the Kasitsna Bay Field Laboratory (the site), a National Ocean Service facility. This site characterization plan (SCP) describes the environmental assessment work at the site.

This SCP contains a discussion of background information pertinent to the site (Section 2.0), project objectives (Section 3.0), the conceptual site model (CSM) (Section 4.0), the proposed field sampling program (Section 5.0), the analytical program (Section 6.0), data validation and evaluation (Section 7.0), the site characterization report to be generated as a result of the field work (Section 8.0), and the field work schedule (Section 9.0).

2.0 BACKGROUND

This section contains descriptions of the site setting (Section 2.1) and historical environmental assessments conducted at the site (Section 2.2).

2.1 SITE SETTING

The Kasitsna Bay Field Laboratory is located in Seldovia, on the Kenai Peninsula. The facility encompasses about 16 acres on the shores of Kasitsna Bay, on the south side of Kachemak Bay, about 10 miles southwest of Homer (see Figure 1). It is accessible from Homer by boat or from Seldovia by Jackolof Bay Road.

The facility is owned by NOAA and is used primarily for marine and intertidal research. The University of Fairbanks also conducts marine biology research at the laboratory. The facility consists of several research buildings, living quarters, a shop, and two small storage sheds (see Figure 2).

~~Physiographically, the site is rough in terrain and~~ is steeply sloped and heavily wooded. Elevations on the site range from sea level to about 135 feet above sea level. Site geologic conditions consist of a thin mantle of glacially derived soils overlying consolidated sedimentary rocks of marine origin, primarily greywacke, chert, and argillite. Soils in the upland portion of the site are up to 6 feet thick and comprise mostly dense organic silt with silty sand and gravel in some areas. In the beach and intertidal zones, the overburden consists of well-graded gravels at least 11 feet thick.

The site is located within the Kachemak Bay State Critical Habitat Area. This area has been classified as being essential to the protection of fish and wildlife habitat. Management of these special areas is the responsibility of the Alaska Department of Fish and Game (ADF&G). Legislation pertaining to the lands may be found in Alaska Statutes Title 16, Chapter 20. An ADF&G Special Area Permit is required for any habitat altering work, including any construction activity.

2.2 HISTORICAL ENVIRONMENTAL ASSESSMENTS

The facility formerly used eight aboveground storage tanks containing diesel fuel and gasoline in three areas of the site. In September 2001, NOAA contracted with Rozak Engineering (Rozak) to decommission seven of the tanks and dispose of them off site; the eighth was inspected and placed back into service (Rozak 2002). As part of the decommissioning work, environmental samples were collected and analyzed to determine whether tank operations had impacted site soils. The Rozak findings are discussed in Section 2.2.1.

On September 26, 2001, NOAA separately contracted with Peratrovich, Nottingham & Drage to conduct a geotechnical survey in support of an ongoing plan to expand the facility. The geotechnical contractor detected a petroleum odor in test pit TP-47, which was excavated within the intertidal zone on Kasitsna Bay. As a result, environmental samples were collected and analyzed to determine the nature of the potentially contaminated soil. The Peratrovich, Nottingham & Drage findings are discussed in Section 2.2.2.

2.2.1 Tank Decommissioning

In September 2001, Rozak decommissioned seven aboveground tanks at the site (see Table 1). During the decommissioning, Rozak and its subcontractor firm emptied the tanks and removed them for off-site disposal, collected environmental samples for field screening and laboratory verification analysis, and conducted removal actions at several areas where petroleum-contaminated soil (PCS) was identified. Information published by Rozak is summarized in this section (Rozak 2002).

When the tanks were decommissioned, soil contaminated with diesel fuel was encountered at several locations, based on visual, olfactory, and field screening evidence. A total of 30 to 35 cubic yards (yd³) of contaminated soil was excavated from several locations, generally to bedrock, and soil samples were collected from each of the three areas. The excavation limits were determined based on sample photoionization detector (PID) readings as well as screening results determined by a Dexsil Corporation PetroFLAG, a turbimetric development tool that measures total petroleum hydrocarbon concentrations in

soil. A total of 11 samples with elevated PetroFLAG results were submitted to a laboratory approved by the Alaska Department of Environmental Conservation (ADEC) for verification analyses. These verification analyses included gasoline-range organic compounds (GRO) using ADEC method AK101 (only 9 of the 11 samples underwent GRO analysis); diesel-range organic compounds (DRO) using ADEC method AK102; and benzene, toluene, ethylbenzene, and xylenes (BTEX) using U.S. Environmental Protection Agency (EPA) method 8021B. Analytical results are presented in Table 2. Additional information regarding each of the areas investigated is provided in the following text.

Area 1. Area 1 contained three tank sites on the hill above the main house and a narrow space between the shed and the rock foundation. No contaminated soil was observed underlying the east tank. Fuel odors were noted around and downslope of the middle tank, and soils were excavated as shown in Figure 3. Contaminated soil was removed to bedrock, but PetroFLAG field screening results indicated low levels of contamination remaining in the fine cracks at the bedrock surface. DRO was detected as high as 15,600 milligrams per kilogram (mg/kg) DRO at sampling location KBL-9, which exceeds the ADEC Method 2 soil cleanup level of 10,250 mg/kg. GRO and BTEX also were detected below ADEC Method 2 cleanup levels in these samples. Confirmation sampling was not conducted beyond the excavation boundary. After the soil was excavated, fertilizer was spread over the bottom of the excavation, and the excavation was backfilled with clean soil.

Area 2. Area 2 contained a single 500-gallon tank site below the main house and across the driveway from the bunkhouse. Fuel odors and elevated PID readings were observed below the tank and along the edge of driveway about 5 feet downslope from the tank. Using PetroFLAG field screening samples to guide the excavation, contaminated soil was removed to bedrock; however, PCS likely remained in the fine material at the bedrock surface. In Area 2, samples within the excavated area contained up to 9,210 mg/kg DRO at sampling location KBL-5. This maximum concentration is below the ADEC Method 2 soil cleanup level of 10,250 mg/kg. GRO and BTEX also were detected below ADEC Method 2 cleanup levels in these samples. Confirmation sampling was not conducted beyond the excavation boundary. After the soil was excavated, fertilizer was spread over the bottom of the excavation, and the excavation was backfilled with clean soil.

Area 3. Area 3 contained three tank sites immediately downslope from the bunkhouse and a spill site near the current location of two propane tanks. A ~~The~~ spill occurred in the winter of 1998, when a 0.375-inch copper fuel line was damaged by a snow plow. The total volume of the fuel

spill is unknown, but 20 gallons of fuel were reportedly recovered. Using PetroFLAG field screening samples to guide the excavation, contaminated soil was removed to bedrock at the tank location and at the spill location. Soil samples collected under the former tank location contained up to 1,300 mg/kg DRO at sampling location KBL-11; soil samples collected within the former spill area contained up to 10,900 mg/kg DRO at sampling location KBL-6. GRO and BTEX also were detected below ADEC Method 2 cleanup levels in these samples. Confirmation sampling was not conducted beyond the excavation boundary. After the soil was excavated, fertilizer was spread over the bottom of the excavation, and the excavation was backfilled with clean soil.

Sampling results indicate that some PCS remains in place, primarily at the interface between soil and bedrock, although use of field screening likely led to the excavation of the majority of accessible PCS. Rozak recommended that additional assessment activities be performed to determine whether contamination has migrated through site soils along the top of bedrock toward nearby Kasitsna Bay. Rozak ~~stated~~did indicate, however, that if such migration had occurred, some contamination could have been intercepted by water or sewer utility line trenches that are oriented parallel to the shoreline.

2.2.2 Geotechnical Study

Also in September 2001, as part of an ongoing plan to potentially expand the facility, NOAA contracted with Peratrovich, Nottingham & Drage to conduct a geotechnical study to determine subsurface conditions at the site, delineate geologic hazards, and provide recommendations for the potential construction of building foundation and access driveways. Using a Caterpillar Model 320L excavator and hand tools, 47 test pits were dug at locations throughout the site to bedrock, which was encountered at depths of 2 to 11 feet below ground surface (bgs). Information published by Peratrovich, Nottingham & Drage (2001) is summarized in this section (2001) and has not previously been submitted to ADEC.

The geotechnical contractor detected a petroleum odor near the water table at a depth of 8 feet bgs in one test pit (TP-47) excavated in the intertidal zone, below a gabion wall and downslope from Area 3. A soil sample was collected from the excavation at that depth and submitted to Sound Analytical Services, Inc. for analysis of petroleum hydrocarbons. Results of the analysis indicated the presence 1,600 mg/kg DRO as well as 59.5 mg/kg GRO; residual-range organic compounds (RRO) were not detected. The extent of PCS was not ~~fully characterized~~ identified at the location of TP-47.

2.2.3 Summary

As a result of the Rozak (2002) study, ADEC provided NOAA with a letter stating the following:

“According to the [Rozak] report, there is a possibility that fuel has migrated across the bedrock toward the nearby shore of Kasitsna Bay. [Rozak] recommends additional assessment in this area. In consideration of this possibility, the department can not conclude that the lowest practicable level of contamination has been achieved at the Kasitsna Bay Research Lab. Additional response action will therefore be required. It is requested that you act upon [the Rozak] recommendation and submit a sampling plan for our review” (ADEC 2003).

Based on the limited work conducted during the Peratrovich, Nottingham & Drage (2001) geotechnical study, it appears that petroleum contamination may have migrated from the Kasitsna Bay Research Laboratory into the intertidal area adjacent to the bay. The extent of contamination in the intertidal area is not known. Although the test pit location is immediately downslope from Area 3 (Rozak 2002), and although both areas contain PCS, it is unclear whether or not a complete migration pathway exists between the two locations.

3.0 OBJECTIVES

Site characterization activities have been designed to obtain data sufficient to meet the following site characterization objectives:

- Evaluate the extent of remaining on-site PCS above ADEC Method 2 soil cleanup levels.
- Collect necessary data to support potential application of ADEC Method 3 soil cleanup levels.
- Characterize the nature and extent of shallow groundwater contamination at the site, if present.
- Collect data sufficient to evaluate whether site groundwater represents a current or future drinking water source under the requirements of Title 18 Alaska Administrative Code (18 AAC) 75.350.
- Evaluate the groundwater to surface water contaminant migration pathway. Compare groundwater concentrations along shoreline to 18 AAC 70 surface water criteria. Evaluate water quality in accordance with 18 AAC 75.345(f) to determine whether detected groundwater contamination will result in unacceptable discharges to surface water. Based on the site characterization data, potentially propose an alternate groundwater point of compliance to ADEC under 18 AAC 75.345(e).
- ~~□ Evaluate the visible horizontal and vertical extent of soil contamination in the intertidal area near historical test pit TP-47. Perform chemical characterization of soil contamination in this area.~~
- Propose corrective actions for the site if necessary.

4.0 CONCEPTUAL SITE MODEL

A CSM describes the degree of connectivity between contamination sources and potential receptors. The elements of a CSM are the geology and hydrogeology of the site, potential sources of contamination, release mechanisms, transport and exposure pathways, and potential receptors.

4.1 GEOLOGY AND HYDROGEOLOGY

The site is located in the Kenai Mountains physiographic province. The Kenai Mountains are part of the Chugach Mountains and consist of sedimentary rocks that earlier formed an accretionary prism that has since been uplifted along an outer-arc high. The area contains intensely deformed sedimentary, volcanic, and ultramafic rocks. At the Kasitsna Bay site, the bedrock is primarily comprised of greywacke, chert, and argillite. The area experienced Quaternary-aged glaciation.

The upland portion of the site consists primarily of bedrock overlain by dense organic silt. Overburden thickness ranges from 2 feet on knobs and hills to more than 6 feet in areas of lower elevation. To bring driveways and building pads to grade, sandy gravel fill has been placed in portions of the site in varying thickness.

The shoreline zone consists of well-graded gravel with sand that extends to depths greater than 11 feet, which is the approximate maximum depth of test pits that were dug in this portion of the site. Bedrock was not encountered in any of the test pits along the beach.

Groundwater was encountered in unconsolidated deposits throughout the majority of the site. Precipitation percolates through the mostly organic overburden and drains to lower elevation creeks and sloughs. Groundwater most likely exists as a thin saturated layer above the low-conductivity, fractured bedrock. In the upland portion of the site, seepage was typically found at the top of the bedrock (Peratrovich, Nottingham & Drage 2001).

4.2 POTENTIAL SOURCES OF CONTAMINATION AND RELEASE MECHANISMS

The primary sources of contamination in the study area include (1) drippage and minor spills from aboveground storage tanks and associated piping removed from the site in 2001 and (2) at least one documented and potentially other undocumented fuel spills ~~of a catastrophic nature~~. Secondary sources include PCS located in areas near and downslope from the primary sources of contamination.

4.3 CONTAMINANT TYPES AND POTENTIALLY AFFECTED MEDIA

The nature of contamination at the Kasitsna Bay Field Laboratory is based on analytical data from soil samples previously collected at the site. Only soil DRO concentrations exceed ADEC Method 2 cleanup levels. Known contaminants are listed as follows:

- DRO has been detected at concentrations as high as 15,600 mg/kg
- GRO has been detected at concentrations as high as 93 mg/kg
- Benzene has been detected at concentrations as high as 0.0826 mg/kg
- Toluene has been detected at concentrations as high as 0.342 mg/kg
- Ethylbenzene has been detected at concentrations as high as 0.896 mg/kg
- m- and p-xylenes have been detected at concentrations as high as 1.54 mg/kg
- o-xylene has been detected at concentrations as high as 1.47 mg/kg

PCS has been identified in soils associated with Areas 1, 2, and 3 (Rozak 2002) and at the location of geotechnical test pit TP-47 in the intertidal portion of the site (Peratrovich, Nottingham & Drage 2001). In Areas 1, 2, and 3, much of the PCS has been removed, but confirmation sampling outside the excavation boundaries may be inadequate to delineate the area of concern relative to exceeded soil cleanup levels, depending on the methodology used to calculate the cleanup levels.

Because groundwater at the site has not been sampled, it is considered to be a potentially affected medium.

In the intertidal area, petroleum hydrocarbons have been detected in soil at a depth of 8 feet bgs. Because contaminants ultimately may be transported to Kasitsna Bay, the waters of the bay are considered to be a potentially affected medium.

Based on the relatively low volatility of DRO, the primary contaminant detected at the site to date, air is not considered to be a potentially affected medium.

4.4 CONTAMINANT TRANSPORT PATHWAYS

Subsurface transport pathways include vertical migration through the vadose zone and lateral migration in the assumed thin, perched groundwater above bedrock. Some migration may also occur in the bedrock.

Overland transport at the site likely is a less active transport mechanism because surface soil contamination is not extensive, diminishing the likelihood that erosion and storm events would mobilize and transport contaminants.

4.5 EXPOSURE PATHWAYS AND RECEPTORS

Based on the ADEC Method 2 cleanup level procedure identified at 18 AAC 75.341 for soil contamination, human health exposure pathways must be evaluated at sites where petroleum releases have occurred. The pathways include (1) incidental ingestion of contaminated soil, (2) inhalation of contaminated soil particulates or chemical vapors, and (3) migration of contaminants to groundwater resources.

Based on preliminary analysis of available, site-specific data, it appears that the third exposure pathway may be considered incomplete based on the apparent lack of a local groundwater resource using the determination standards set forth at 18 AAC 75.350. Incidental ingestion and inhalation of contaminated soil are, therefore, considered to be viable human health exposure pathways.

In accordance with 18 AAC 75.345(d) and (f), the potential for surface water and sediment contamination must be assessed using the water quality standards set forth at 18 AAC 70.020(b) at sites where groundwater discharges to surface water. At the Kasitsna Bay Research Laboratory, groundwater in the shallow, presumably perched aquifer is expected to discharge to Kasitsna Bay. Under 18 AAC 70.020, use classification C (Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife) can be assigned to the bay and presumably to the intertidal zone. ~~The water and sediment quality standards provided at 18 AAC 70.020(b) are applicable for use classification C for marine waters.~~ These standards provide the most stringent cleanup standards allowed in the Alaska regulations and guidance.

5.0 FIELD SAMPLING PROGRAM

Section 5.1 discusses the rationale for selecting sampling locations. Section 5.2 discusses site restoration activities that will be conducted as necessary.

5.1 SAMPLING LOCATIONS AND RATIONALE FOR SELECTION

Sections 5.1.1 through ~~5.1.6~~ 5.1.5 summarize the fieldwork that will be conducted to meet the objectives described in Section 3.0.

5.1.1 Objective 1 – Evaluate Extent of Petroleum-Contaminated Soil in Upland Area

Based on available data, PCS remains on site at several locations. Specifically, Rozak (2002) soil sample KBL-6, collected from Area 3 at 2 feet bgs, contained 10,900 mg/kg DRO, and soil sample KBL-9, collected from Area 1 at 1 foot bgs, contained 15,600 mg/kg DRO. The ADEC Method 2 cleanup level for DRO is 10,250 mg/kg for the ingestion pathway, the more stringent cleanup level provided for the ingestion (10,250 mg/kg) and inhalation (12,500 mg/kg) exposure pathways. This cleanup level is applicable for use at Kasitsna Bay Field Laboratory site. GRO concentrations in all samples collected by Rozak at the site were below the ADEC Method 2 cleanup level for GRO of 1,400 mg/kg, so no additional sampling for GRO is necessary. Similarly, sample results for BTEX compounds all were below their respective ADEC Method 2 cleanup levels, so no additional sampling for BTEX is necessary.

At Areas 1, 2, and 3, PCS already has been removed to bedrock, and additional removal likely is not practicable; however, the soil sampling program conducted by Rozak during the soil removal work did not verify the lateral extent (if any) of PCS above ADEC Method 2 soil cleanup levels at Areas 1 and 3. ~~One~~Two L-shaped test pits will be installed at each of these locations (see Figure 4). The test pits will begin near the location where the highest level of DRO contamination was detected during the Rozak investigation, and they will extend vertically to bedrock and horizontally past the boundary of the previously excavated areas until field screening samples and visual and olfactory evidence indicate that PCS is no longer encountered. Three soil samples will be collected at each ~~of these locations~~test pit and analyzed for DRO using ADEC Method AK102 to verify that the maximum amount of PCS that could have been excavated from these areas was removed during the 2001 tank decommissioning work.

Each soil sample will be collected using a new, decontaminated, stainless steel spoon. Sample material will be homogenized in new, decontaminated, aluminum foil trays or stainless steel bowls and placed into sample containers. The containers will be placed in coolers containing ice until they are delivered to the laboratory for analysis.

Soil samples will be screened in the field using a PID equipped with a 10.6-electron-volt lamp. PID readings will be compared to PID readings obtained for background conditions, and these PID readings will be recorded on test pit logs. Laboratory samples will be selected based on the PID readings such that the objectives defined in Section 3.0 will be met.

If PCS is identified, it will be removed and placed in U.S. Department of Transportation (DOT)-approved drums. The drums will be sealed, covered, and staged at the site for later disposal, pending analytical

results. The test pits will be backfilled with clean, excavated soil, or with clean, imported fill. This fill material will be compacted using the field equipment.

5.1.2 Objective 2 – Collect Data to Support Development of Alaska Department of Environmental Conservation Method Three Soil Cleanup Levels

Although ADEC Method 2 soil cleanup levels are likely adequate for the site, ADEC Method 3 soil cleanup levels may be used. To support that possibility, one soil sample from each area at which soil samples are collected will be analyzed for total organic carbon.

5.1.3 Objective 3 – Characterize Nature and Extent of Shallow Groundwater Contamination

To evaluate the nature and extent of shallow groundwater contamination, five groundwater well points (designated KBL-WP1 through KBL-WP5) will be advanced. The approximate well point locations are shown on Figure 4; actual well point locations will be based on site conditions.

The rationale for siting each of the well points is described as follows:

- Well point KBL-WP1 will be advanced directly downgradient of the Area 1 excavated soil area.
- Well point KBL-WP2 will be advanced directly downgradient of the Area 2 excavated soil area.
- Well point KBL-WP3 will be advanced directly downgradient of the excavated soil area associated with the 1998 diesel spill area.
- Well point KBL-WP4 will be advanced further downgradient of the excavated soil area associated with the 1998 diesel spill area, upslope and upgradient of the gabion wall.
- Well point KBL-WP5 will be advanced near the location of former test pit TP-47, in the intertidal area downslope and downgradient of the gabion wall.

Well points will be constructed of galvanized steel with a 1-foot-long, 0.010-inch slotted drive point screen. The well points will be installed with a manual slide hammer and will be advanced to refusal, determined to be the bedrock surface based on previous test pit logs and additional test pits advanced during this site characterization (see Section 6.1). If refusal is encountered above the anticipated bedrock surface, the well point will be withdrawn and moved to a nearby location. When the target depth is achieved, the water level in the well point will be measured, and groundwater sampling will be attempted using dedicated low-density polyethylene tubing and a peristaltic pump. Groundwater pumped from the well point will first be measured for water quality parameters including temperature, pH, specific conductance, dissolved oxygen, oxidation-reduction potential, and salinity. Groundwater samples will

then be collected. After sample collection, the well points will be withdrawn and decontaminated using an Alconox® soap and warm water wash, followed by a deionized water rinse. The well points will be labeled and stored.

The groundwater samples will be submitted to an ADEC-approved analytical laboratory for analysis of GRO using ADEC method AK101, DRO using ADEC method AK102, and BTEX using EPA method 8260B.

~~Because the groundwater is not a current or reasonably expected future drinking water source,~~ GRO, DRO, and BTEX data will be compared to the groundwater cleanup levels provided at 18 AAC 75.345(b)(1) “Table C” or to alternate levels that may be established in accordance with 18 AAC 75.345(b)(2) or (3), as appropriate and discussed in the following section.

5.1.4 Objective 4 – Evaluate Current and Expected Future Groundwater Resource Potential

The current source of drinking water at the Kasitsna Bay Field Laboratory is surface water, and NOAA does not plan to use groundwater as a drinking water resource. In any case, the thin unconsolidated horizon above bedrock likely could not provide a sustainable water supply, and water quality in the bedrock aquifer so near the bay is uncertain. In addition, because the site borders Kasitsna Bay, no potential groundwater users exist downgradient of the facility. Because this is the case, the groundwater cleanup levels provided at 18 AAC 75.345(b)(1) may be overly stringent and not wholly applicable at the site.

If GRO, DRO, or BTEX concentrations exceed the 18 AAC 75.345(b)(1) cleanup levels, therefore, NOAA may request the cooperation of ADEC in making a formal determination of nonuse of the groundwater resource for drinking water, in accordance with 18 AAC 75.345(b)(2). To that end, the information required to make such a determination (specified at 18 AAC 75.350) will be documented during this site investigation. Results of this evaluation will be provided to ADEC in a formal request letter for consideration of this topic.

5.1.5 Objective 5 – Evaluate Groundwater to Surface Water Contaminant Migration Pathway

In accordance with 18 AAC 75.345(f), groundwater that discharges to surface water may not cause a violation of water quality standards for surface water or sediment. ~~To ensure that this is the case, t~~^{he} two groundwater samples that will be collected nearest Kasitsna Bay (at well points KBL-WP4 and KBL-WP5) will be submitted for analysis of total aromatic hydrocarbons (TAH) using EPA Method

8260B and total aqueous hydrocarbons (TAqH) using EPA Method 8270C SIM to characterize groundwater contamination near the shoreline and to evaluate potential impacts to surface water. The samples for EPA Method 8620B analysis will be preserved in the field using hydrochloric acid~~methanol~~.

***Note:** The proposed TAH and TAqH analytical methods are different than those specified in 18 AAC 70.020(b) (EPA Methods 602 and 610, respectively). ADEC approval is requested for the use of these alternate methods, which will obtain adequate detection levels to meet the needs of this project and which are more readily available.*

Up to two sediment samples will also be collected along the Kasitsna Bay beach in areas where evidence of groundwater seeps or petroleum hydrocarbon discharge are observed, if any. These samples will undergo analysis for BTEX using EPA Method 8260B and PAHs using EPA Method 8270C SIM. Note that no visual evidence of discharge has been observed on the beach, so it is possible that no sediment samples will be collected to meet this objective. For purposes of this investigation, sediments are considered to be the upper 2 feet of soils on the Kasitsna Bay beach, the area expected to represent the biologically active zone.

~~5.1.6—Objective 6—Evaluate Extent of Petroleum Contaminated Soil in Intertidal Area~~

~~During the 2001 geotechnical boring study conducted by Peratrovich, Nottingham & Drage (2001), petroleum hydrocarbons were identified at a depth of 8 feet bgs at the location of TP-47. A soil sample collected from this area contained 1,600 mg/kg DRO. Although this concentration is below the ADEC Method 2 cleanup level for soil, the source and extent of contamination were not delineated. Several test pit trenches will be excavated using a trackhoe or excavator in the intertidal area to (1) determine the extent of petroleum contamination and (2) verify that petroleum hydrocarbons have not migrated into intertidal area sediments. All appropriate permits for excavation work in the intertidal area will be obtained before work begins.~~

~~If the extent of contaminated soil is limited, such soils will be removed, containerized, and staged on site for characterization and off site disposal. If the extent of contaminated soil cannot be determined using test pits (for example, because incoming tides restrict working hours or would cause the test pit walls to cave), however, the excavated pits will be backfilled with the clean overburden layer. Five soil samples are proposed within the intertidal area to document the extent of contaminated soil remaining at the site. These samples will undergo DRO analysis using ADEC Method AK102 unless they are collected in the upper 2 feet. In that case, the samples will be considered to be sediment, and they also will undergo analysis for BTEX using EPA Method 8620B and PAHs using EPA Method 8270C SIM.~~

5.2 SITE RESTORATION

During excavation work, control measures will be taken to prevent erosion and sedimentation damage resulting from site characterization activities. In the unlikely event that work must be conducted during a rainfall event, or if a test pit must be left open overnight, appropriate control measures will include the placement of hay bales, a silt fence, or desilting basins downslope from the excavation. Otherwise, the excavations will be backfilled to original grade immediately after sampling and compacted using the trackhoe or excavator. Compaction in confined areas would be accomplished using hand tools such as manually operated vibratory equipment. The final grade of the area and cover material will be consistent with the intended usage and existing landscape.

6.0 ANALYTICAL PROGRAM

The analytical program consists of the methodologies used to analyze the samples (Section 6.1) and the quality control program (Section 6.2).

6.1 ANALYTICAL METHODOLOGY

All soil and groundwater samples collected for laboratory analysis will be shipped to and analyzed by an off-site, ADEC-approved laboratory. Tables 3A and 3B summarize soil/sediment and groundwater sampling activities, respectively. The approximate numbers of samples that will be submitted for analysis and the analytical methods under which they will be analyzed are identified. Data quality objectives for analytical laboratory analyses shown on Table 4 are taken from the ADEC underground storage tank procedures manual (ADEC 1999) for ADEC methods and EPA “Test Methods for Evaluating Solid Waste” (EPA 1996) for EPA methods. Table 5 contains information on sample containers, preservation methods, and holding times.

6.2 QUALITY CONTROL SAMPLES

To determine the repeatability and variability of the chemical analyses and provide for quality assurance and quality control (QA/QC) of the sampling and analytical process, duplicate samples, equipment rinsate samples, trip blanks, and matrix spike and matrix spike duplicate samples will be collected and analyzed. The number and types of QA/QC samples are listed in Table [54](#).

In addition, strict chain of custody will be maintained on the samples at all times. Samples will remain in the control of the field sampling team until they are received by a courier or delivery service, at which

time chain-of-custody forms will be transferred to that agent. Throughout the shipping process, these forms will be used to document the location of the samples until they are delivered to the laboratory.

7.0 DATA VALIDATION AND EVALUATION

A cursory data validation will be conducted of all analytical results. A cursory data validation consists of reviewing 100 percent of the data summary forms and will be performed by Tetra Tech. This evaluation will focus on assessing the laboratory's compliance with analytical method requirements and will serve as a final QA/QC check on laboratory performance. In addition, field sample data will be evaluated in light of the QA/QC sample data, and any QA/QC effects on the field data will be documented during the validation.

Data gathered during the soil characterization will be transcribed for evaluation and reporting from field notebooks, photographic documentation, and analytical laboratory reports. The soil sampling locations and concentrations of chemicals detected will be entered into a geographic information system for graphical display.

The following will also be performed:

- The delineated extent of soil, sediment, and groundwater contamination will be graphically represented in the SCR.
- Concentrations of detected chemicals will be compared to ADEC cleanup levels published at 18 AAC 75. Concentrations of chemicals detected that exceed cleanup levels will be documented in the Kasitsna Bay Field Laboratory SCR.

Results from the site characterization activities will be represented in tables and figures in the SCR. A narrative section in the SCR will document the soil characterization activities and discuss the results with respect to the nature and extent of soil contamination and correlation with groundwater contamination.

8.0 SITE CHARACTERIZATION REPORT

Tetra Tech will prepare a site characterization report (SCR) in accordance with 18 AAC 75.380. The SCR will include the following:

- Documentation of all field activities conducted
- Reproductions of digital photographs and field notes (provided in appendices)
- Reproductions of all laboratory sheets, chain-of-custody forms, and test pit logs

- Documentation of all potential sources of contamination
- Photographic documentation of all test pit excavations
- Tables presenting the analytical data for concentrations of detected chemicals in soil and groundwater, which will include a comparison to ADEC cleanup levels
- Figures showing cross-section diagrams of site stratigraphy as interpreted from test pit logs
- Figures showing soil and groundwater contaminant distributions as determined by laboratory results
- Identification and characterization (such as concentration levels) of all contaminants of concern, recommended ADEC cleanup levels, and horizontal and vertical extent and estimated volume of soil, sediment, and groundwater that exceeds cleanup levels

9.0 FIELD WORK SCHEDULE

Fieldwork will be initiated within 30 calendar days of approval of this SCP. ADEC will be notified of the planned start date at least 14 days before the field work begins.

REFERENCES

- ADEC. 1999. "Underground Storage Tanks Procedures Manual, Guidance for Treatment of Petroleum-Contaminated Soil and Water and Standard Sampling Procedures." December.
- ADEC. 2003. Letter Regarding "NOAA Kasitsna Bay Research Lab, Seldovia, Alaska, ADEC SPILL #00239934301, Report of Corrective Action Work." From Gary B. Folley, Environmental Specialist, ADEC. To Minh Trinh, NOAA. April 8.
- Peratrovich, Nottingham, & Drage, Inc. 2001. Geotechnical Report, NOAA/NOS Kasitsna Bay Laboratory Redevelopment. December.
- Rozak Engineering. 2002. Letter Regarding Report of 2001 Corrective Action Work – Contaminated Soil Sites, NOAA Kasitsna Bay Research Lab, Seldovia, Alaska. From Ronald T. Rozak, P.E., Principal Investigator to Alaska Department of Environmental Conservation. To Gary Folley, Engineering Specialist, ADEC. July 1.
- U.S. Environmental Protection Agency. 1996. *Test Methods for Evaluating Solid Waste*. EPA/SW-846. Third Edition. December.

FIGURES

**SITE CHARACTERIZATION PLAN
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

AUGUST 21, 2003



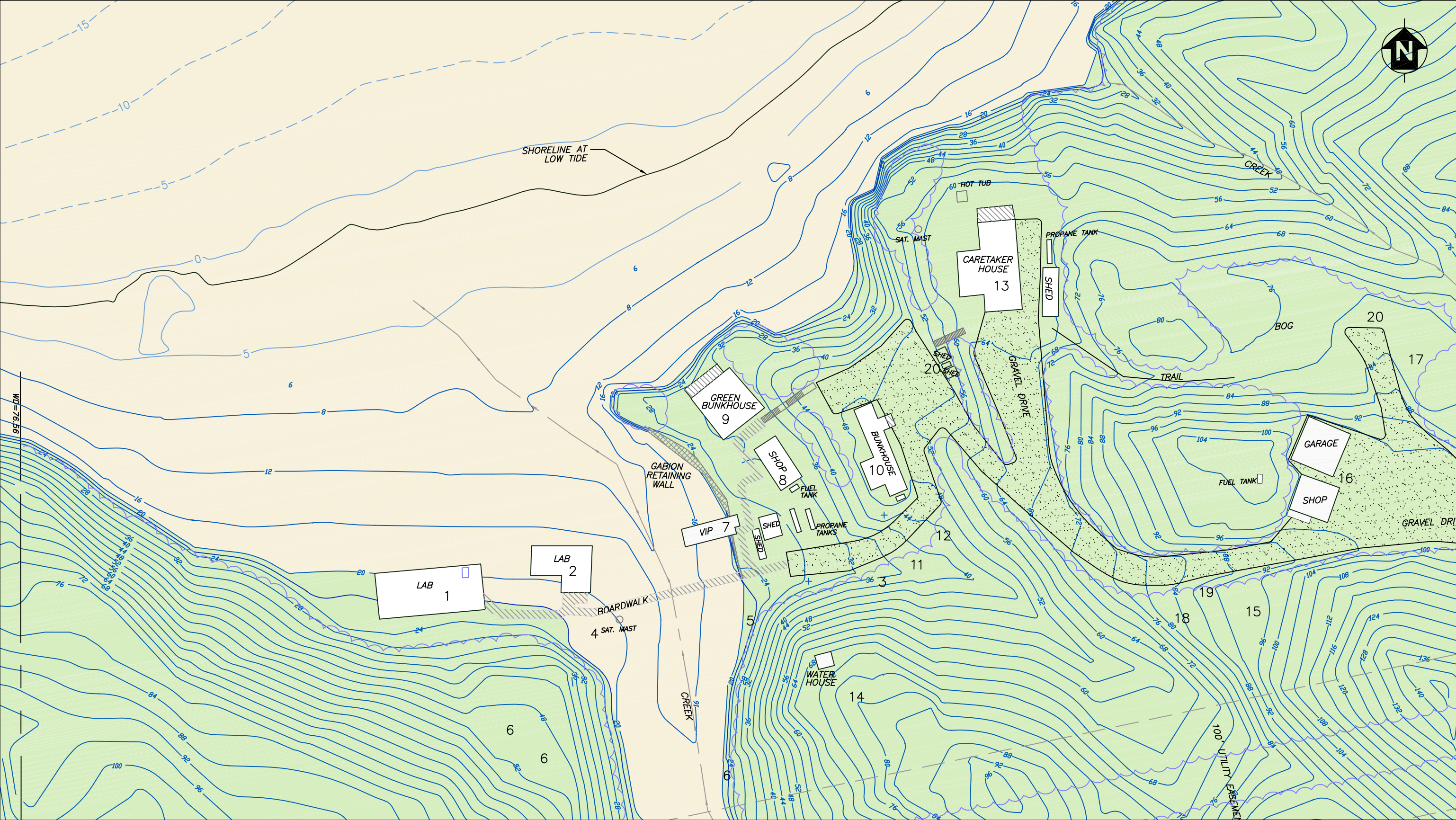
50 0 50 100
 APPROXIMATE SCALE IN MILES

FIGURE 1

SITE LOCATION MAP
 KASITSNA BAY FIELD LABORATORY
 SELDOVIA, ALASKA



TETRA TECH, EM INC.



Topographic Contour Lines
(Contour interval = 4 feet)

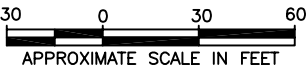
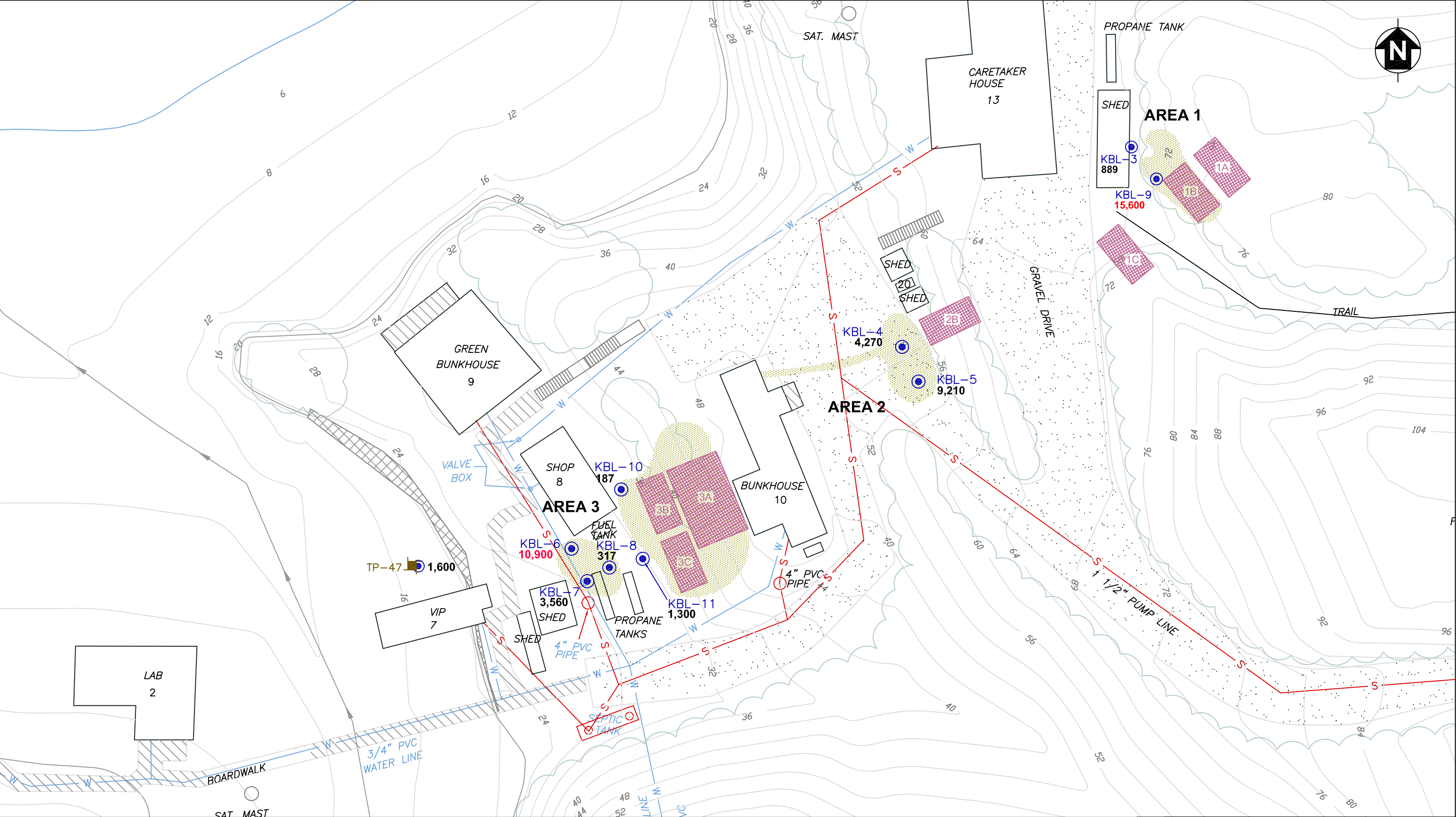


FIGURE 2

SITE MAP
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA

TETRA TECH, EM INC.



LEGEND

- Locations of decommissioned ASTs
- Excavated soil area
- Previous test pit location

- Previous soil sample location
- Approximate location—waterline
- Approximate location—sewerline
- 889 DRO concentration (9/01) in mg/kg.
- Red Indicates exceedence of ADEC Method 2 criteria

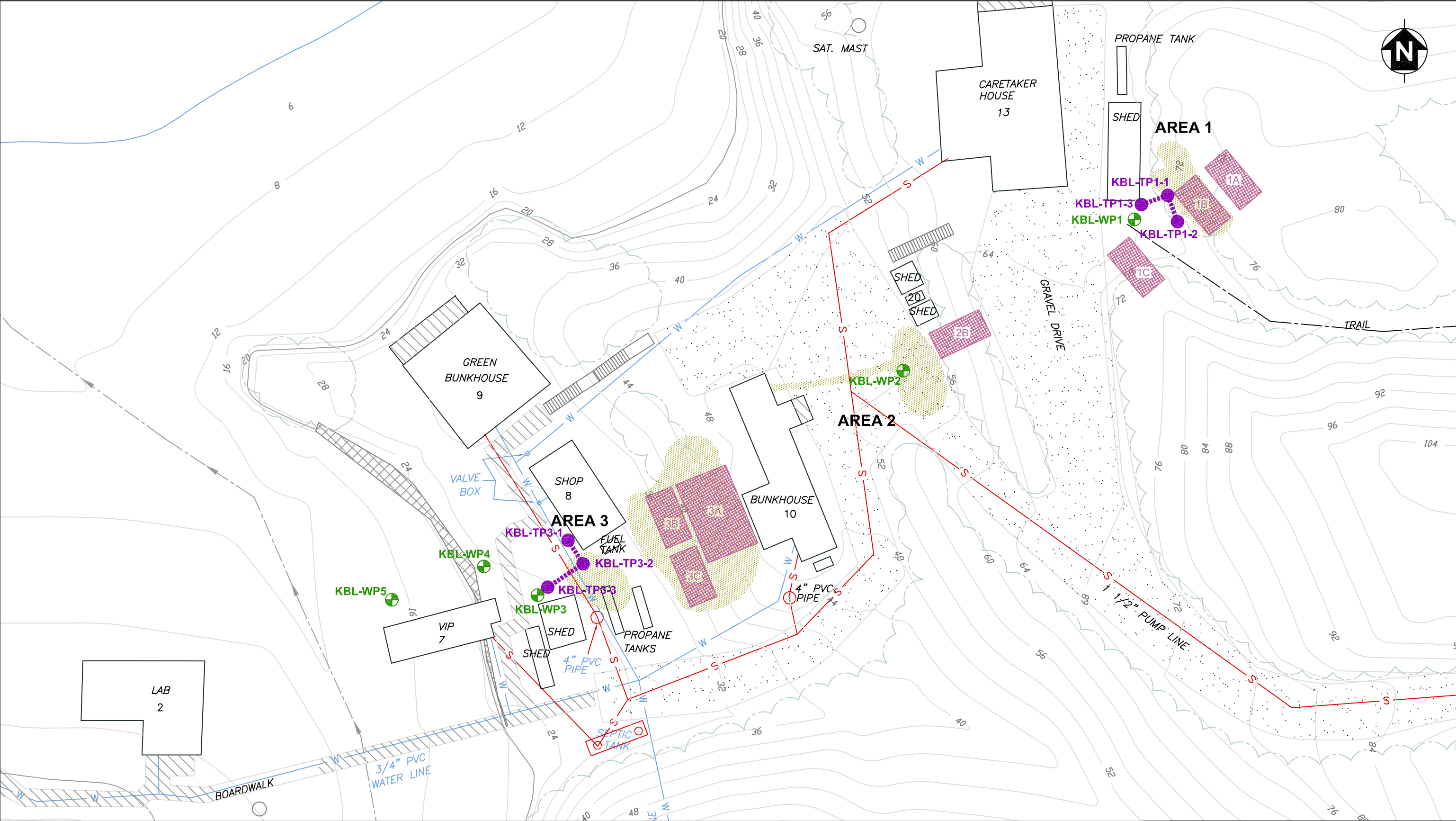
- Notes:
- 1) AST = Aboveground storage tank
 - 2) DRO = Diesel range organics
 - 3) The ADEC Method 2 cleanup level for DRO is 10,500 mg/kg.



FIGURE 3

HISTORIC SOIL SAMPLING DATA
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA

TETRA TECH, EM INC.



LEGEND

- Locations of decommissioned ASTs
- Excavated soil area
- Test pit

- Well point location
- Approximate location—waterline
- Approximate location—sewerline

Notes:
1) AST = Aboveground storage tank
2) Sediment sampling locations to be determined



FIGURE 4

PROPOSED TEST PIT AND DRIVE POINT LOCATIONS
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA

TETRA TECH, EM INC.

TABLES

**SITE CHARACTERIZATION PLAN
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

AUGUST 21, 2003

TABLE 1

**ABOVEGROUND STORAGE TANKS DECOMMISSIONED IN 2001
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

Tank Number	Location	Capacity (gallons)	Product Stored	Date Decommissioned
1A	On hill behind shed near house	500	Diesel fuel	September 2001
1B	On hill behind shed near house	500	Gasoline	September 2001
1C	Near driveway below house	1000	Gasoline	September 2001
2B	Next to south shed below house	500	Gasoline	September 2001
3A	On hillside above generator shed	3000	Diesel fuel	September 2001
3B	On hillside just below Tank 3A	500	Diesel fuel	September 2001
3C	On hillside just below Tank 3A	500	Diesel fuel	September 2001

Source: Rozak Engineering 2002

TABLE 2

2001 TANK DECOMMISSIONING SOIL SAMPLE ANALYTICAL RESULTS (mg/kg)
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA

Analyte	ADEC Cleanup Level ^b	Sample Identification, Sample Date, Depth, and Area ^a										
		KBL-1 09/07/01 1.5 feet Area 3	KBL-2 09/07/01 1.5 feet Area 3	KBL-3 09/07/01 1.0 foot Area 1	KBL-4 09/08/01 2.5 feet Area 2	KBL-5 09/08/01 2.5 feet Area 2	KBL-6 09/08/01 2.0 feet Area 3	KBL-7 09/08/01 3.0 feet Area 3	KBL-8 09/08/01 4.0 feet Area 3	KBL-9 09/08/01 1.0 foot Area 1	KBL-10 09/24/01 1.0 foot Area 3	KBL-11 09/24/01 0.7 feet Area 3
PetroFlag Screening	--	NA	NA	523	1880	>5,000	>2,500	2160	15	>2,500	162	386
Diesel range organics	10,250	6,070	8,860	889	4,270	9,210	10,900	3,560	317	15,600	187	1,300
Gasoline range organics	1,400	93	73	4	23	2.4U	26	16	4U	5	NA	NA
Benzene	9	0.0243 U	0.199 U	0.0134U	0.0598	0.0122 U	0.0826	0.0148 U	0.0196 U	0.0255U	NA	NA
Toluene	180	0.970 U	0.794 U	0.0628	0.342	0.0489 U	0.337	0.0591 U	0.0783 U	0.102 U	NA	NA
Ethylbenzene	89	0.970 U	0.865	0.0535 U	0.896	0.0489 U	0.673	0.0730	0.0783 U	0.102 U	NA	NA
Xylenes, m- and p-	81 ^c	0.970 U	0.794 U	0.0535 U	1.54	0.0489 U	1.49	0.144	0.0783 U	0.102 U	NA	NA
Xylene, o-	81 ^c	0.970 U	0.794 U	0.0535 U	1.02	0.0489 U	1.47	0.513	0.0783 U	0.102 U	NA	NA

Source: Rozak Engineering 2002

Notes:

- a Bold text indicates detected concentration exceeds ADEC Method 2 cleanup level
- b Cleanup levels shown are the more stringent of the ADEC Method 2 cleanup levels for ingestion and inhalation in 18 Alaska Administrative Code 75.341
- c Cleanup level is sum of both xylene analyses

U Analyte was analyzed for but was not detected at the shown reporting limit

ADEC Alaska Department of Environmental Conservation
mg/kg milligrams per kilogram
NA Not analyzed
TPH Total petroleum hydrocarbons

TABLE 3A

**PROPOSED SOIL AND SEDIMENT SAMPLING ACTIVITIES
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

Sample Identification No. ^a	Media	DRO ADEC AK102	BTEX EPA 8260B	PAHs EPA 8270C SIM	TOC EPA 9060
KBL-TP1-1	Soil	X			X
KBL-TP1-2	Soil	X			
KBL-TP1-3	Soil	X			
KBL-TP3-1	Soil	X			X
KBL-TP3-2	Soil	X			
KBL-TP3-3	Soil	X			
KBL-TP4-1	Soil	X			X
KBL-TP4-2	Soil	X			
KBL-TP4-3	Soil	X			
KBL-TP4-4	Soil	X			
KBL-TP4-5	Soil	X			
KBL-SD1	Sediment	X	X	X	
KBL-SD2	Sediment	X	X	X	

Notes:

a Quality control samples are not included in this summary.

ASTM	American Society for Testing and Materials
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
DRO	Diesel-range organic compounds
EPA	U.S. Environmental Protection Agency
MS/MSD	Matrix spike and matrix spike duplicate
PAH	Polynuclear aromatic hydrocarbons
TOC	Total organic carbon

TABLE 3B

**PROPOSED GROUNDWATER SAMPLING ACTIVITIES
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

Sample Identification No. ^a	Media	GRO ADEC AK101	DRO ADEC AK102	BTEX EPA 8260B	TAH EPA 8260B	TAqH EPA 8270C SIM
KBL-WP1	Groundwater	X	X	X		
KBL-WP2	Groundwater	X	X	X		
KBL-WP3	Groundwater	X	X	X		
KBL-WP4	Groundwater	X	X		X	X
KBL-WP5	Groundwater	X	X		X	X

Notes:

a Quality control samples are not included in this summary.

ADEC	Alaska Department of Environmental Conservation
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
DRO	Diesel-range organic compounds
EPA	U.S. Environmental Protection Agency
GRO	Gasoline-range organic compounds
MS/MSD	Matrix spike and matrix spike duplicate
TAH	Total aromatic hydrocarbons (defined in 18 AAC 70.020)
TAqH	Total aqueous hydrocarbons (defined in 18 AAC 70.020)

TABLE 4

**LABORATORY DATA QUALITY OBJECTIVES
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

Page 1 of 2

Analyte	Method	Matrix	Quant. Limit ^a	Precision ^b	Accuracy (MS) ^b	Accuracy (LCS) ^b
Gasoline-range organic- compounds	AK101	Soil	±	0-20	60-140	60-120
Gasoline-range organic compounds	AK101	Water	50	0-20	60-140	60-120
Diesel-range organic compounds	AK102	Soil/ <u>Sediment</u>	10	0-20	60-140	75-125
Diesel-range organic compounds	AK102	Water	50	0-20	60-140	75-125
Total Organic Carbon	9060	Soil/ <u>Sediment</u>	1000	0-25	70-130	70-130
Benzene	8260B	Soil/ <u>Sediment</u>	0.05	0-20	50-150	50-150
Toluene	8260B	Soil/ <u>Sediment</u>	0.05	0-20	50-150	50-150
Ethylbenzene	8260B	Soil/ <u>Sediment</u>	0.05	0-20	50-150	50-150
m,p-Xylenes	8260B	Soil/ <u>Sediment</u>	0.05	0-20	50-150	50-150
o-Xylene	8260B	Soil/ <u>Sediment</u>	0.05	0-20	50-150	50-150
Chlorobenzene	8260B	Soil	0.05	0-20	50-150	50-150
1,2-Dichlorobenzene	8260B	Soil	0.05	0-20	50-150	50-150
1,3-Dichlorobenzene	8260B	Soil	0.05	0-20	50-150	50-150
1,4-Dichlorobenzene	8260B	Soil	0.05	0-20	50-150	50-150
Benzene	8260B	Water	1	0-20	50-150	50-150
Toluene	8260B	Water	1	0-20	50-150	50-150
Ethylbenzene	8260B	Water	1	0-20	50-150	50-150
m,p-Xylenes	8260B	Water	1	0-20	50-150	50-150
o-Xylene	8260B	Water	1	0-20	50-150	50-150
Chlorobenzene	8260B	Water	1	0-20	50-150	50-150
1,2-Dichlorobenzene	8260B	Water	1	0-20	50-150	50-150
1,3-Dichlorobenzene	8260B	Water	1	0-20	50-150	50-150
1,4-Dichlorobenzene	8260B	Water	1	0-20	50-150	50-150

TABLE 4

**LABORATORY DATA QUALITY OBJECTIVES
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

Page 2 of 2

Analyte	Method	Matrix	Quant. Limit ^a	Precision ^b	Accuracy (MS) ^b	Accuracy (LCS) ^b
Naphthalene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	56-117	58-121
Acenaphthylene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	59-115	54-122
Acenaphthene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	59-114	58-119
Fluorene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	61-113	57-122
Phenanthrene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	51-122	57-123
Anthracene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	50-116	44-125
Fluoranthene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	52-124	54-127
Pyrene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	49-124	56-123
Benz(a)anthracene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	50-122	50-124
Chrysene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	48-121	51-122
Benzo(b)fluoranthene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	52-144	44-149
Benzo(k)fluoranthene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	55-135	52-140
Benzo(a)pyrene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	49-128	42-129
Indeno(1,2,3-cd)pyrene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	37-132	48-134
Dibenzo(a,h)anthracene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	37-136	49-136
Benzo(g,h,i)perylene	8270C SIM	Soil/ <u>Sediment</u>	0.005	0-20	28-132	46-134
Naphthalene	8270C SIM	Water	0.1	0-20	70-120	62-128
Acenaphthylene	8270C SIM	Water	0.1	0-20	70-120	67-140
Acenaphthene	8270C SIM	Water	0.1	0-20	70-120	62-132
Fluorene	8270C SIM	Water	0.1	0-20	70-120	66-137
Phenanthrene	8270C SIM	Water	0.1	0-20	70-120	59-133
Anthracene	8270C SIM	Water	0.1	0-20	70-120	64-145
Fluoranthene	8270C SIM	Water	0.1	0-20	70-120	65-139
Pyrene	8270C SIM	Water	0.1	0-20	70-120	64-140
Benz(a)anthracene	8270C SIM	Water	0.1	0-20	70-120	57-135
Chrysene	8270C SIM	Water	0.1	0-20	70-120	57-125
Benzo(b)fluoranthene	8270C SIM	Water	0.1	0-20	70-120	47-149
Benzo(k)fluoranthene	8270C SIM	Water	0.1	0-20	70-120	46-139
Benzo(a)pyrene	8270C SIM	Water	0.1	0-20	70-120	57-143
Indeno(1,2,3-cd)pyrene	8270C SIM	Water	0.1	0-20	70-120	58-147
Dibenzo(a,h)anthracene	8270C SIM	Water	0.1	0-20	70-120	56-152
Benzo(g,h,i)perylene	8270C SIM	Water	0.1	0-20	70-120	53-146

Notes:

- a Quantitation limits are milligrams per kilogram (mg/kg) for soil and sediment samples, and micrograms per liter (µg/L) for water samples
- b Precision is expressed as relative percent difference, and matrix spike is expressed as percent difference

LCS Laboratory control sample
MS Matrix spike

TABLE 5

**FIELD QUALITY CONTROL SAMPLES
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

Media	Number of Field Samples	Field Duplicate (10 percent of field samples)	MS/MSD ^a (5 percent of field samples)	Equipment Blank
Soil	13 8	2 1	1	1
Groundwater	5	1	1	1

Notes:

- a Additional sample volume will be collected for each MS/MSD to provide adequate material for the MS and MSD analyses. MS/MSD samples are not considered additional samples since the spikes are performed on existing samples.
- b In addition to the quality control samples above, trip blanks at a frequency of one per cooler for volatile organic compound analysis (including GRO, BTEX, and TAH) are transported and will be analyzed.

BTEX Benzene, toluene, ethylbenzene, and total xylenes
GRO Gasoline- range organic compounds
MS/MSD Matrix spike and matrix spike duplicate
TAH Total aromatic hydrocarbons

TABLE 6

**ANALYTICAL METHOD REQUIREMENTS
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

Analyte	Method	Minimum Volume	Preservation	Holding Time
SOIL AND SEDIMENT SAMPLES				
DRO	ADEC AK102	4 oz.	Ice to 4 °C	14 days
BTEX	EPA 8260B	4 oz.	Methanol in field	28 days
PAHs	EPA 8270C SIM	4 oz.	Ice to 4 °C	
Total organic carbon	EPA 9060	4 oz.	Ice to 4 °C	
GROUNDWATER SAMPLES				
GRO	ADEC AK101	40 mL	HCl to pH < 2.0; ice to 4 °C	14 days
DRO	ADEC AK102	500 mL	HCl to pH < 2.0; ice to 4 °C	14 days
BTEX/TAH	EPA 8260B	40 mL	HCl to pH < 2.0; ice to 4 °C	14 days
PAHs/TAqH	EPA 8270C SIM	500 mL	Ice to 4 °C	7 days

Notes:

ADEC	Alaska Department of Environmental Conservation
DRO	Diesel-range organic compounds
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
EPA	U.S. Environmental Protection Agency
HCl	Hydrochloric acid
GRO	Gasoline-range organic compounds
mL	Milliliter
oz.	Ounce
PAH	Polynuclear aromatic hydrocarbons
TAH	Total aromatic hydrocarbons
TAqH	Total aqueous hydrocarbons
°C	Degrees centigrade

ENCLOSURE 2

**ADF&G CORRESPONDENCE REGARDING PERMITTING OF INTERTIDAL EXCAVATIONS
KASITSNA BAY FIELD LABORATORY
SELDOVIA, ALASKA**

AUGUST 21, 2003

-----Original Message-----

From: Ellen Simpson [mailto:ellen_simpson@fishgame.state.ak.us]
Sent: Monday, August 11, 2003 12:57 PM
To: Vick, Heather
Cc: Lee F Hammarstrom; Mark J Fink
Subject: RE: Special Area Permit

Heather - If you decide that you need to test the intertidal site at Kasitsna Bay, anytime after Sept. 1 (or possibly a bit earlier) would be fine. The president of the local fishermen's coop told me this morning that fishing in the area would be over by then, even though the area is open by regulation through September 30.

We would suggest that the upland excavate be completed before the intertidal work is begun and based on the extent of the contamination found at the upland sites, reevaluate the need to go to the intertidal site. *[emphasis added]*

ADF&G would require the following as stipulations in an Special Area Permit - 1) Sorbent boom should be deployed to surround the worksite to contain any sheen that may be released. 2) ADF&G should be copied with all test results. Let me know your plans.

-----Original Message-----

From: Ellen Simpson [mailto:ellen_simpson@fishgame.state.ak.us]
Sent: Friday, July 25, 2003 9:59 AM
To: Vick, Heather
Cc: Lee F Hammarstrom (E-mail)
Subject: RE: Special Area Permit

Heather - I've reviewed your Special Area Permit application and have tried to phone you to discuss your project but your line has been busy. I'll try again but I wanted to let you know that we can not allow you to dig the test pits in the intertidal area until sometime in September. There are salmon set net sites in Kasitsna Bay very close to the NOAA lab site. These fishermen cannot move to any other location or fish at a different time. Any contamination would compromise the quality of their product. Even though the risk is probably quite low any risk is unacceptable at this time. I'll be in all day today and would like to discuss this with you.

-----Original Message-----

From: Vick, Heather [mailto:Heather.Vick@ttemi.com]
Sent: Thursday, July 24, 2003 1:12 PM
To: 'ellen_simpson@fishgame.state.ak.us'
Subject: RE: Special Area Permit

Ellen,

Thanks for looking at the application. Our plan is to dig at lower low tide and to work as quickly as possible to collect samples and determine extent of contamination. We intend to cover the excavation back up with clean overburden prior to the area being submerged. The surface would be lined with plastic to protect it from the material removed from the excavation. Absorbent diapers will be on hand to pick up any contamination at the surface. In other words, our intent is to prevent any contact between bay water and the excavation.

Please let me know if this is satisfactory or if you need additional information.

Thanks,
Heather

-----Original Message-----

From: Ellen Simpson [mailto:ellen_simpson@fishgame.state.ak.us]
Sent: Thursday, July 24, 2003 12:47 PM
To: Vick, Heather
Subject: RE: Special Area Permit

Heather - I received your application just last Tuesday and will begin the review today. One thing that jumped out at me was that there is no mention of using any boom or containment in the event that contaminants are released into the environment. Do you plan on protectively booming off the area?

-----Original Message-----

From: Vick, Heather [mailto:Heather.Vick@ttemi.com]
Sent: Wednesday, July 23, 2003 11:07 AM
To: 'ellen_simpson@fishgame.state.ak.us'
Subject: Special Area Permit

Ellen,

I need to find out the status of the Special Area Permit that was requested last week for the Kasitsna Bay Field Lab in Seldovia, AK. We've made arrangements to mobilize to the field next Monday, July 28, assuming we would be able to obtain the permit. Can you let me know what the status is?

Thanks,

Heather Vick
425-673-3644